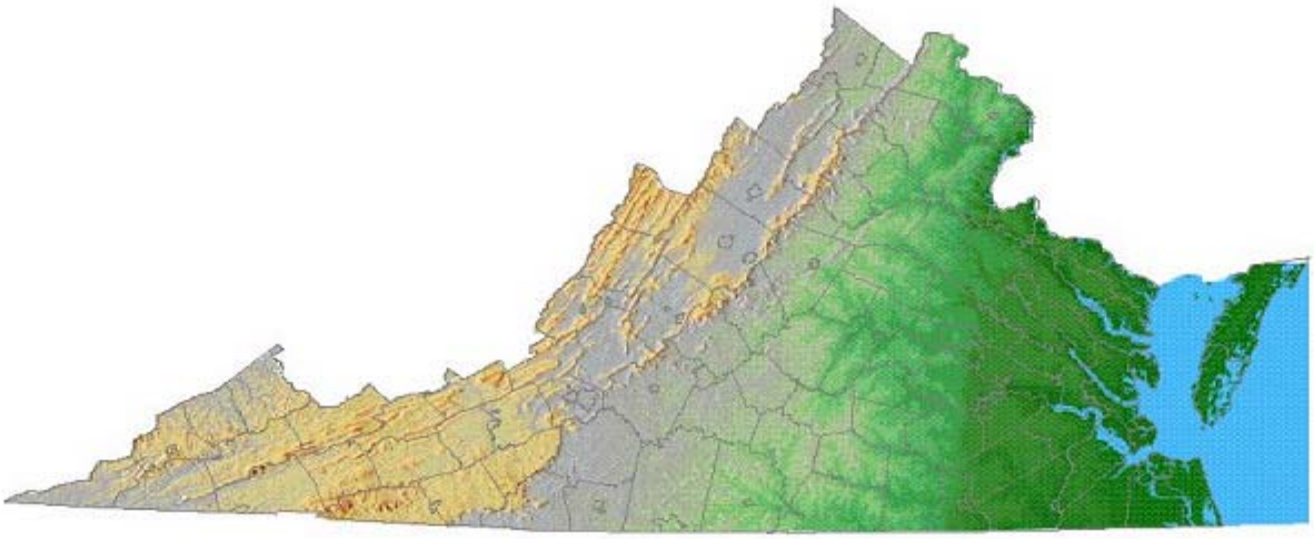
Virginia Base Mapping Program (VBMP)
Digital Orthophotography Project

Virginia Geographic Information Network (VGIN),
VGIN Advisory Board
Wireless E-911 Services Board and
Virginia State and Local Governments



SENATE OF VIRGINIA

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LOCAL GOVERNMENT
TRANSPORTATION

January 22, 2003

Local Government Partner:

On behalf of the Virginia Geographic Information Network (VGIN) Advisory Board, the Wireless E-911 Services Board, and the VGIN staff, I wish to thank you for your cooperation and support for the Virginia Base Mapping Program (VBMP). I would also encourage your community's ongoing support and participation in the development of a consistent statewide geospatial data infrastructure for Virginia.

Geospatial data and applications are critical to providing our citizens with the very best in services, from Wireless E-911 and homeland security, to planning, resource management, and economic development. The VBMP products, which provide a seamless statewide foundation for geospatial data and GIS, give us an unprecedented opportunity to work together to expand citizen services, share critical data resources and expertise and minimize costs. However, the VBMP's digital orthophotography products are only the beginning. As we complete the first round of digital orthphoto production we continue to move forward on several fronts.

First, the VGIN Board is working with both private and public sector partners to establish programs and partnerships, which will support the ongoing maintenance and update of the VBMP digital orthophotography products in the future. The data must remain current to remain valuable.

Second, with support from the Wireless E-911 Services Board, the Secretary of Technology, the Department of Transportation, and local governments across Virginia, the VBMP program will build a statewide road centerline file and statewide addressing database. The VBMP Centerline Program is projected to produce a statewide road centerline file, fully integrated with the VBMP digital orthos by December 2003 and a cooperative and sustainable state and local address file by June of 2004.

Third, VGIN, working with local government GIS users and managers groups from across the Commonwealth, will review, evaluate, and establish standards and guidelines for additional layers of geospatial data to ensure that ongoing data development will contribute to a consistent, efficient, and effective statewide geospatial information infrastructure.

The Virginia Base Mapping Program's digital orthophotography project is an important first success. It will provide expanded opportunities for every community in the Commonwealth. I appreciate your support for VGIN's work and the VGIN Board and staff looks forward to continuing to work with you in the future.

Sincerely.

John C. Watkins
Chairman, VGIN Advisory Board

Virginia Base Mapping Program (VBMP)
Local Government Product Deliverables

Digital Orthophotography - Digital Orthophotography is aerial photography rectified so that accurate measurements can be taken from the image. A digital ortho provides all of the visual content of a photograph while being as accurate as a map for measurements.

All of the Digital orthophotography required to cover a municipality with at least a 1000 foot buffer will be delivered to each County and City in the Commonwealth by the end of March 2003. The digital orthophotography will be seamless within a jurisdiction and across the Commonwealth. Orthophotography is being produced at one of 3 resolutions based on population density and upgrade options.

Product True Color (24 bit), GeoTiff format

Format: 2 ft resolution (1" = 400' scale); 10,000 x 10,000 ft tiles
1 ft resolution (1" = 200' scale); 5,000 x 5,000 ft tiles
½ ft resolution (1" = 100' scale); 2,500 x 2,500 ft tiles (optional)

Orientation: GeoTiff, Va. State Plane (N/S), NAD 83 (HARN), NAVD 88, U.S. Survey Feet

Digital Terrain Model (DTM) - A DTM is a model of the earth's surface which is used to remove distortions in the photography caused by changes in land elevation (valleys and ridges). The DTM allows the rectification of photography of a 3-dimensional surface to an accurate 2-dimensional photo-map. The DTM used for ortho rectification of the VBMP will be delivered as part of the project with one DTM file for each orthophoto tile.

Hydrography – All visible water or hydrographic features such as Streams, Rivers, Lakes, Swamps and Shore lines have been developed from the VBMP photography at the corresponding imagery scale. The Hydrography file is part of the DTM data files and instructions are provided for accessing and separation.

Product Format: Micro station DGN format (Point, Line & Poly features)

Ancillary Data: Reports and Datafiles - All of the data and reports, developed through the course of the project related to the photography and dtms covering a jurisdiction will be delivered to each County and City. This information is be valuable in the efficient development of additional data from the product (structure outlines, contour data, etc.) .

Ancillary Data: Raw Image Scans – All of the digital image scans of the raw aerial photography film is included for delivery. These images, along with the orientation information in the reports and data files, can be used to support additional data development (I.e., structure outlines, contour data, etc.) to be developed in a photogrammetric environment.

Virginia Base Mapping Program (VBMP)
Local Government Deliverable

Operating Options:

Hardware

System requirements for use of the VBMP data will generally be the same as required by the software used to view or access the data.

All data for the VBMP Local Government deliverables are being provided on DVD's (Digital Video Disks). The data can be loaded on hard disk or accessed from the DVD using any **DVD-R** compliant DVD reader. The disks are single sided with a data capacity of 4.7 GB (4.3 GB usable), although each disk delivered may not be completely filled with data. The orthophotography files are large and the amount of time required to access or copy files from the DVD's depends on the speed of the DVD reader, the faster the reader the better.

Additional hard disk space (internal or external disk drive) may be required to store or back-up the VBMP data. This will depend on the capacity of the system on which the data is being loaded and user preferences. External hard disks, which use one of the new fast "firewire" or "USB 2.0" connectors may require an adapter card to work with an existing system.

Software

Orthophotography from the VBMP can be viewed using any software that can read and display the TIFF version 6.0 file format. The TIFF v6 format is widely used and software that support this file format can generally be grouped into two categories; image viewers and GIS softwares.

Raster Image Viewing Software

Image viewing software will display raster images like the VBMP orthophotography. The images can generally only be viewed one tile at a time. With viewer software images do have any geo-referencing. Therefore any measurements made on the photo are reported in photo units rather than in ground units.

"Imaging for Windows" by Kodak which comes by default with the Windows2000 operating system is an example of an image viewing software. Additional information on Tiff viewers can be found at http://hazmat.dot.gov/ntsb/ntsb_viwer_help.htm.

CADD/GIS Applications

The orthophotography and DTM data from the VBMP can be readily opened and used by many CADD (Computer Aided Design and Drafting) and almost all GIS software. One advantage of GIS software is that multiple files can be viewed at one time allowing for the assemblage and viewing of large areas.

These software also use the geo-referencing embeded in the file header or an alternate world file (.twf) to display orthophotography in its' proper geographic location. Tiff world

files are included on the orthoimagery DVD's for software that require separate world files. All locations and measurements on the photo or tile are therefore reported relative to their absolution location on the surface of the earth and measurements are reported in ground units.

Examples of software that can be used to work with the VBMP data include:

- ILS Geoviewer by International Land Systems Inc. (http://www.landsystems.com)
- ArcExplorer by ESRI, which can be downloaded free from their web site at http://www.esri.com/software/arcexplorer/index.html.

VBMP Index Files (identifying the tile grid, etc.) are provided in ESRI shapefile format. ArcView or the free ArcExplorer application and most other GIS software can read the index shapefiles included with the data.

Other VBMP data including reports (control, DAT, etc.) and data tables can be opened and used with a word processing and/or spreadsheet application like Microsoft Word or Microsoft Excel.

The raw image scans of the photographic film used to develop the orthoimagery is provided in the Z/I Imaging Tiff-JPG format. This is a loss-less compressed Tiff format. These files can be viewed using specialized software such as RasView by Intergraph Imaging Systems (http://www.intergraph.com) or ILS Geoviewer by International Land Systems Inc. (http://www.landsystems.com).

Loading

The VBMP data can be used directly from the DVD's or copied to a local hard disk using any **DVD-R** compliant DVD reader. The faster the DVD reader the less time it will take to load the data.

The sub-directory structure of the data on the disk is intended to help organize the data. It is recommended that the directory structure be maintained so that the VBMP Data Index file will work properly.

The Digital Terrain Model (DTM) used to orthorectify the aerial photography is provided in the Bently Microstation "dgn" format. DTM files can be loaded in ESRI Arcview 3.2 using the CAD extension and right clicking on the file name. This will allow you to load points, lines or polygon features contained in the dgn file into separate shape files within an existing ArcView project.

Water features or hydrology is included in the DTM files as 3 dimensional features. These elements can be viewed in ArcView 3.2 by importing the point and line features of the dgn file and mapping the features thematically by level. Documentation of the DTM/Hydro feature levels are included in the DTM metadata files and in the hydrology documentation that is part of this deliverable document.

Storage

The Orthophotography from the Virginia Base Mapping Program (VBMP) was developed at one of three scales depending on population/housing density and local options. The imagery is organized by tile with the size of the tile dependant on the scale of the imagery. The **size of the file** is the same regardless of scale or tile size.

Image Resolution	Imagery Scale	Tile Size	Approx. File Size
½ foot	1"=100'	2,500’ x 2,500’	75 Mb
1 foot	1"=200'	5,000’ x’ 5,000’	75 Mb
2 foot	1"=400'	10,000’ x 10,000’	75 Mb

Average DTM file Size	150 Kb
Raw Image Scan file Size	50 Mb

Example:

The average number of tiles per jurisdiction in the project is 210. If you wish to store all of the data on a hard drive the disk space required to store this data (based on the 210 tiles) would be approximately 25.8 Gb as follows:

Orthophotography	210 x 75 Mb	15.4 Gb
DTM Files	210 x 150 Kb	31 Mb
Raw Scans	~230 x 50 Mb	11.3 Gb
Ancillary Index & Reports	100 Mb	100 Mb
Total		25.8 Gb

Actual storage requirements will depend on the number of tiles and image scans being delivered for an individual jurisdiction. Actual storage will also depend on what data you expect to use and how you choose to access it.

Accessing or Loading Data

Data Organization:

You have received three sets of DVD's.

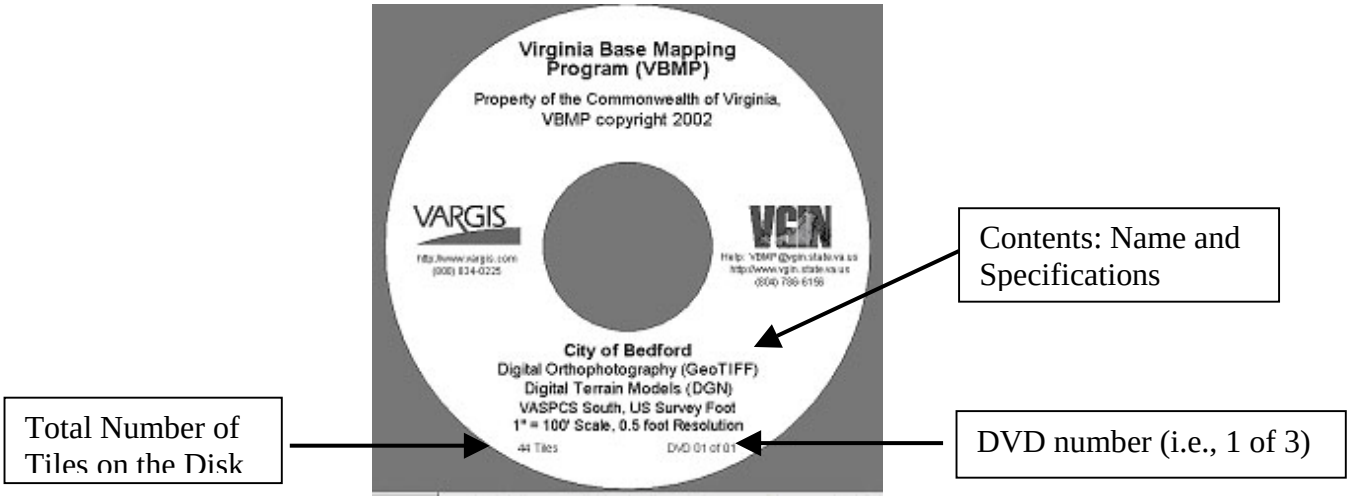
(1) One set of DVD's includes the digital orthophotographs and corresponding DTM's for each tile covering your jurisdiction and extending up to 1000' feet beyond.
(2) One DVD or set of DVD's of Ancillary Data – the Scanned Aerial Photography.
(3) One DVD or set of DVD's of Ancillary Data – Reports, Data Files, etc.

The files on each set are organized as follows:

Digital Ortho/ DTM's

The digital ortho / DTM **DVD**'s may be divided again with digital orthos and DTMs for each scale on separate DVDs. This will depend on whether your community is covered by one scale of data or is a combination of two scales of data. If your community is covered by digital orthos and DTM's of more than one scale then you will receive one set of DVD's with digital orthos and dtms of one scale (i.e. 200) and a second set of DVD's with all the digital orthos and DTMs for all the digital orthos and DTMs at the second scale (i.e. 400).

The DVD(s) will look like this:



Each of the DO/DTM disks will also include a number of standard datasets. The directory structure for the DO/DTM Data Disks is indicated below along with a brief description of the data contained in each.

Digital Orthophotography & Digital Terrain Model DVD Disk Content:

D:\Dtm **D**igital Terrain Model (DTM) data in Intergraph Microstation (dgn) format. Water features or Hydrologic features are contained in the DTM files as 3 dimentional points and lines. The hydrologic features are separated by feature type on different "levels" as defined in the DTM metadata.

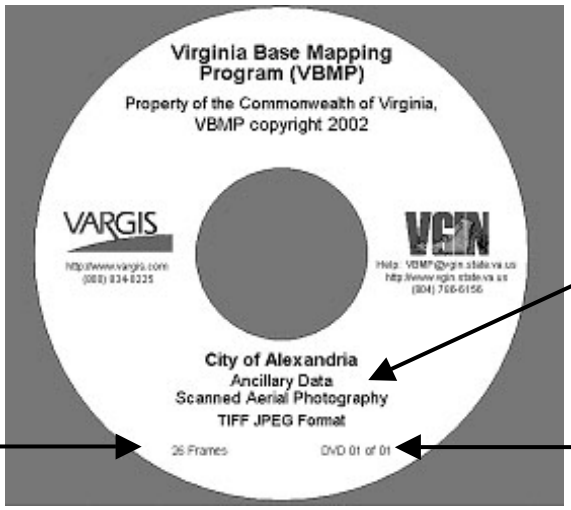
D:\Geotiff All of the geotiff orthoimagery files covering your locality.

D:\Geotiff\twf Tiff World Files (twf) for applications that require these orientation files.

D:\Metadata – Metadata for the orthoimagery and dtm data. Metadata records have been developed for each scale of imagery and dtm for each state plane zone (n/s).

D:\Index – Index for the imagery tiles and DVD Contents in ESRI Shape file format.

Ancillary Data – Scanned Aerial Photography

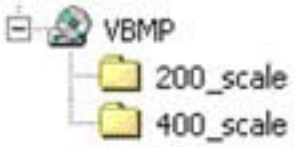


Contents: Scanned Aerial Photography

Total Number of Frames on the Disk

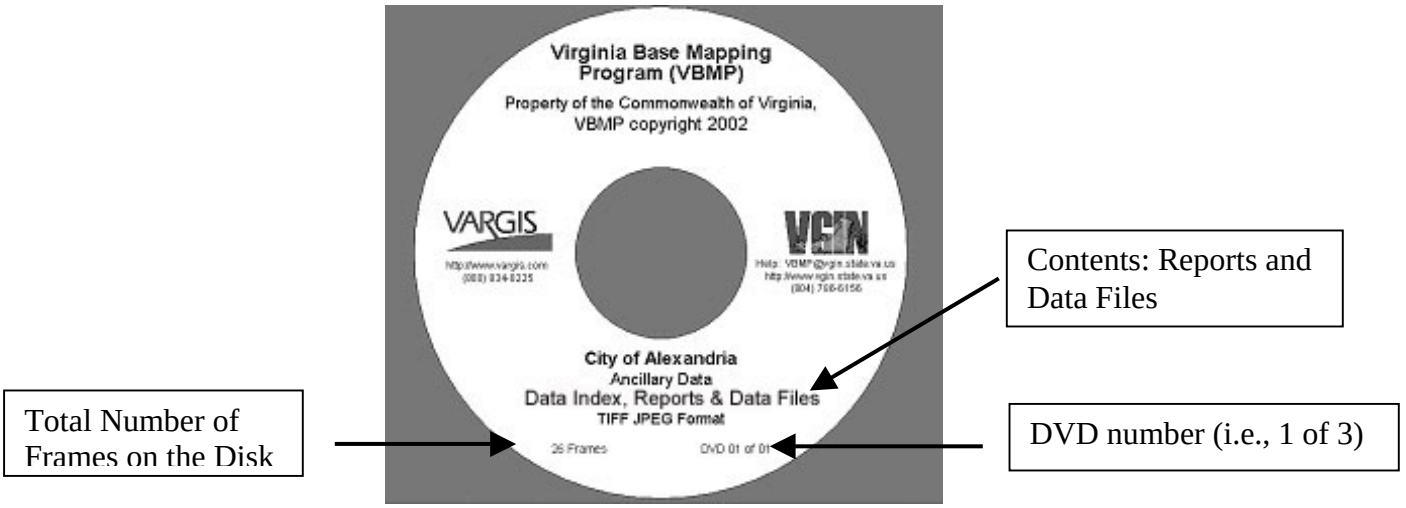
DVD number (i.e., 1 of 2)

The image scans for the photography used to develop orthoimagery over the locality are provided in TIFF JPEG format. More than one scale of scanned image may be included on the same DVD but scans for each scale will be divided into separate sub-directories.



Ancillary Data - Scanned Aerial Photography Directory Structure

Ancillary Data - Data Index, Reports, Data files, and Documentation



Data Index and navigation to the data:

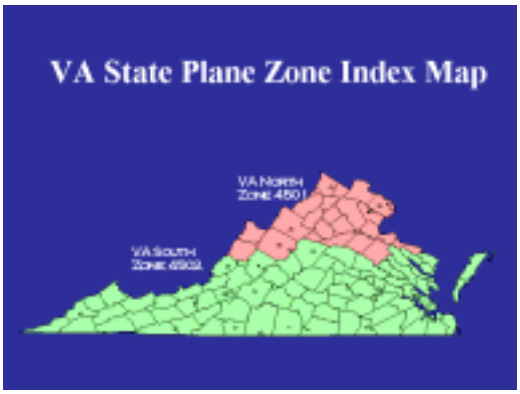
- Format – Shape files
- Content:
  - Flight lines, Photographs, AGPS Db
  - Ground Control Networks
  - AT Production Blocks
  - Ortho Tiles
  - Etc.

Virginia Base Mapping Program (VBMP)
Local Government Product Deliverables

Orthophoto / DTM - Tile Grid, Tile Size and Tile ID

Anchoring the Ortho Photos: Tile Grid and Projection

The Virginia Base Mapping Program (VBMP) digital orthophotography project has divided the state into "tiles". Each tile represents one aerial photograph and one digital terrain model. Together the tiles form a grid pattern across the state. The "tile grid" is laid out or anchored in the State Plane coordinate system. Because Virginia is divided into two State Plane Coordinate Zones, North and South, there are two "tile grids" for the state. One grid is anchored in State Plane Coordinate Zone NORTH, the other is anchored in State Plane Coordinate Zone SOUTH. Counties and cities that are located at the border of the zones are buffered by an additional 1000 feet in the projected into the same zone as the community. The break between the State Plane Projections, North and South runs along county boundaries approximately paralleling Interstate 64 as it runs across the middle of the Commonwealth.



State Plane Zones

Tile (Photo) Size based on Scale

In order to provide the best possible orthophotography for each location and meet budget requirements the Photography and DTMs were acquired/developed at three scales based on the population density of the area being covered. Locations with less than 100 people per square mile were flown at 400 scale (2 foot resolution pixels). Locations with 100 people or more per square mile were flown at 200 scale (1 foot resolution pixels). A few locations that chose the high-resolution option were flown at 100 scale (1/2 foot resolution pixels).

Because the "tile" (or photo) size depends on the "scale" of the photography and DTM, there are three different sized tiles in the VBMP, one for each scale. These include:

- 10,000 x 10,000 ft tiles (measured in ground feet) for the 2 foot resolution - 400 scale photography - 1:4800 scale (1 inch = 400 feet)

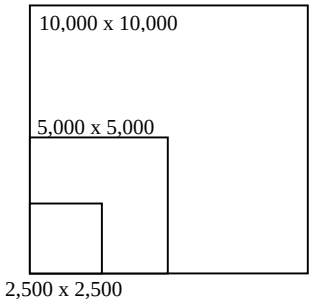
- 5,000 ft. x 5,000 ft. tiles for the 1 foot resolution - 200 scale - 1:2400 scale (1 inch = 200 feet)

- 2,500 ft. x 2,500 ft. tiles for the ½ foot resolution - 100 scale (1 inch = 100 feet)

Uniform and Seamless Tile (Photo) Grid

The three tile sizes (each representing photos) combine to form a grid of tiles or photos (one for State Plane North and one for State Plane South). The grid is uniform because the each smaller sized tile is a ¼ fraction of the larger tile. The smaller tiles are "nested" or "fit" within the larger tiles. Therefore the tile mix across any county or city can meet the scale requirements of the project and still remain seamless.

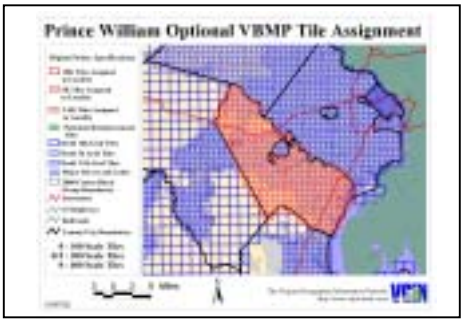
Tile fractions or "Nested"



Typical County Grid of Mixed Tiles

At the beginning of the VBMP a map of each county/city was created showing how the tile grid and the mix of tiles would be flown or fit across the county/city, based upon the population density defined by the 2000 Census. Counties and cities were offered the option (December 2001) to redefine the scale/size of tiles being flown across a portion or all of their jurisdiction. The final grid layout (by scale) over each county/city is available at:

Sample County Grid Layouts - before and after optional "upgrade" adjustment



Tile Identification – Tile ID: Unique and Logical

In order be able to work efficiently with the tiles/photos it was necessary to give each tile a unique identifier or name and to use a logical process for determining ID's/names so users could more easily understand the approximate location of a tile based on its name or ID.

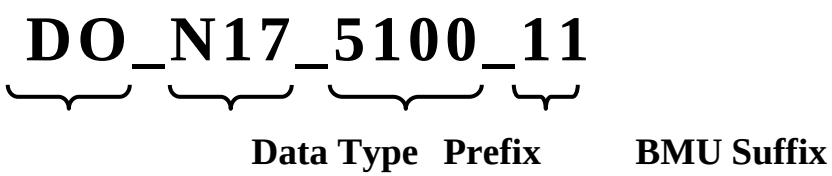
A procedure was established to determine the Tile ID based on (1) the State Plane Coordinate Zone the tile resided in and (2) the "X" and "Y" coordinates for the lower left corner (Southwest corner) of each Tile in the 400 scale grid. Because smaller scale tiles may be nested within the 400 scale grid, where 200 and 100 scale tiles exist their ID numbers begin with the 400 scale grid in which they are located.

Each tile ID is prefixed by a character string indicating "data type" (either DO or DTM). This is followed by the Tile ID, which is divided into three parts, all separated by an underscore ("_"): (1) a tile Prefix; (2) the Base Modular Unit (i.e. 400 Scale grid tile ID); and (3) a tile Suffix.

An example of the digital orthophoto Tile ID for a grid tile, with coordinates from the lower left / (SouthWest) corner of a sample tile which are:

"x" coordinate (easting) – E 11,500,000*
"y" coordinate (northing) – N 7,100,000

The Tile Name is then:



Data Type

DO/dtm The data type in the file is indicated by the first character string. "**DO**" represents digital orthophotography files and "**dtm**" represents digital terrain model files.

Part 1. Prefix

N/S The first digit of the prefix indicates the state plane zone for the location of the lower left corner of the file. Virginia has 2 state plane zones. "**N**" represents the North State plane zone and "**S**" represents the South State plane zone.

EN The second 2 digits indicate the coordinate pairing of the million units of the Easting and Northing for the Lower Left corner of the tile grid. Although this coordinate pairing is not necessary to insure uniqueness within a single county or region, it is used to insure uniqueness of tile names across state. *10,000,000 unit of the Easting is redundant in the Commonwealth and not used.

Part 2. Base Modular Unit (BMU) 10,000 foot grid

"x" coordinate (easting) – E 11,**50**0,000*
"y" coordinate (northing) – N 7,**10**0,000

The base modular unit is based on the location of the lower left corner or the 10,000 foot tile grid. The four digit number is constructed using coordinate pairings of the northing and easting.

E = 100,000 unit of the Easting of the State Plane Coordinates for the Lower Left corner of the tile.
N = 100,000 unit of the Northing of the State Plane Coordinate for the Lower Left corner of the tile.
E = 10,000 unit of the Easting of the State Plane Coordinates for the Lower Left corner of the tile.
N = 10,000 unit of the Northing of the State Plane Coordinate for the Lower Left corner of the tile.

Part 3. Suffix (Identifying 200 and 100 scale tiles)

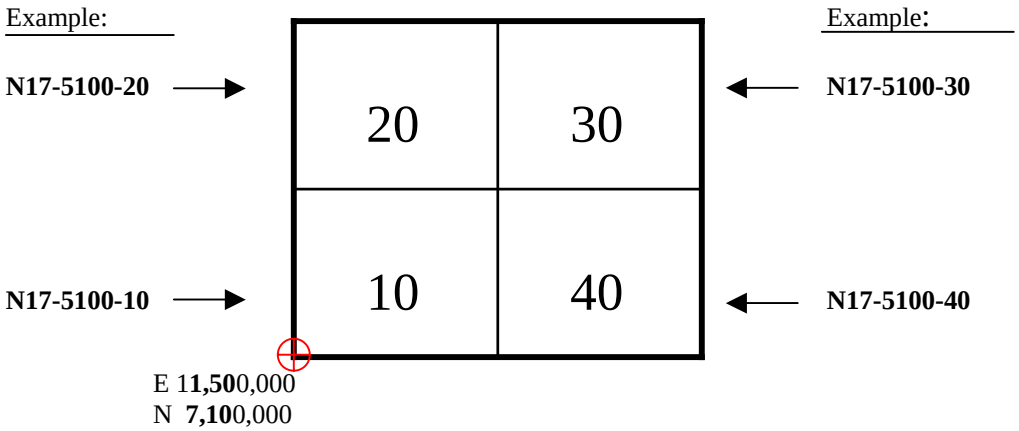
The value of the suffix number indicates the scale and/or location of a 200 or 100 scale tile with respect to the BMU or 400 scale, 10,000 foot grid tile.

The name of the 400 scale tile is defined by the BMU. However, in order to maintain a consistent and fixed length file name for all of the files, the suffix is also required for 400 scale, 10,000 x 10,000 grid tiles and the number for all 400 scale tiles is always "00".

The naming convention for 200 Scale (5k) tiles and 100 Scale (2.5k) tiles is based on the 400 scale grid tile in which the 200 or 100 scale tile falls. The first three parts of the Tile ID for 200 and 100 scale tiles is based on the 400 scale tile in which the tile falls. The suffix of the Tile ID completes the tile ID.

200 Scale (5,000' x 5,000') Tiles:

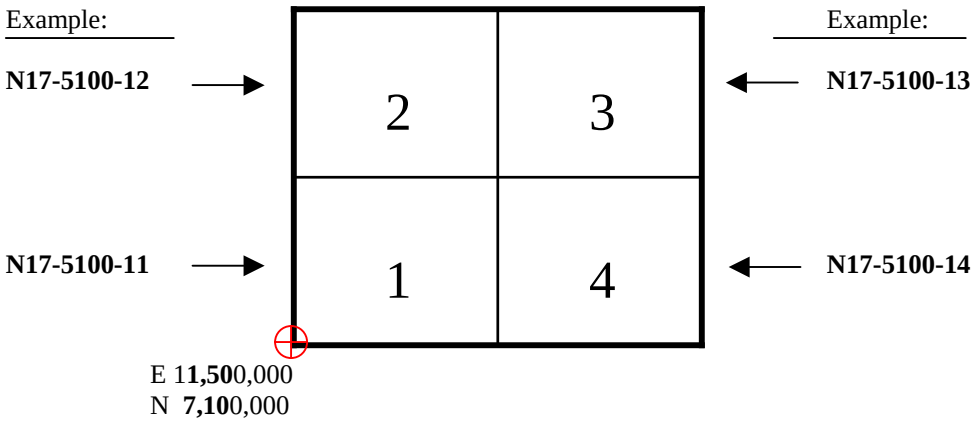
Each 200 Scale tile is numbered relative to the quadrant of the 400 scale tile (10,000' x 10,000') that it occupies. The 200 scale tiles are numbered 10, 20, 30 or 40 starting with the tile occupying the lower left quadrant of the 400 scale tile and increasing in a clockwise direction.



400 Scale Tile: N17-5100 **200 Scale Tiles: N17-5100-10**
N17-5100-20
N17-5100-30
N17-5100-40

100 Scale (2,500' x 2,500') Tiles:

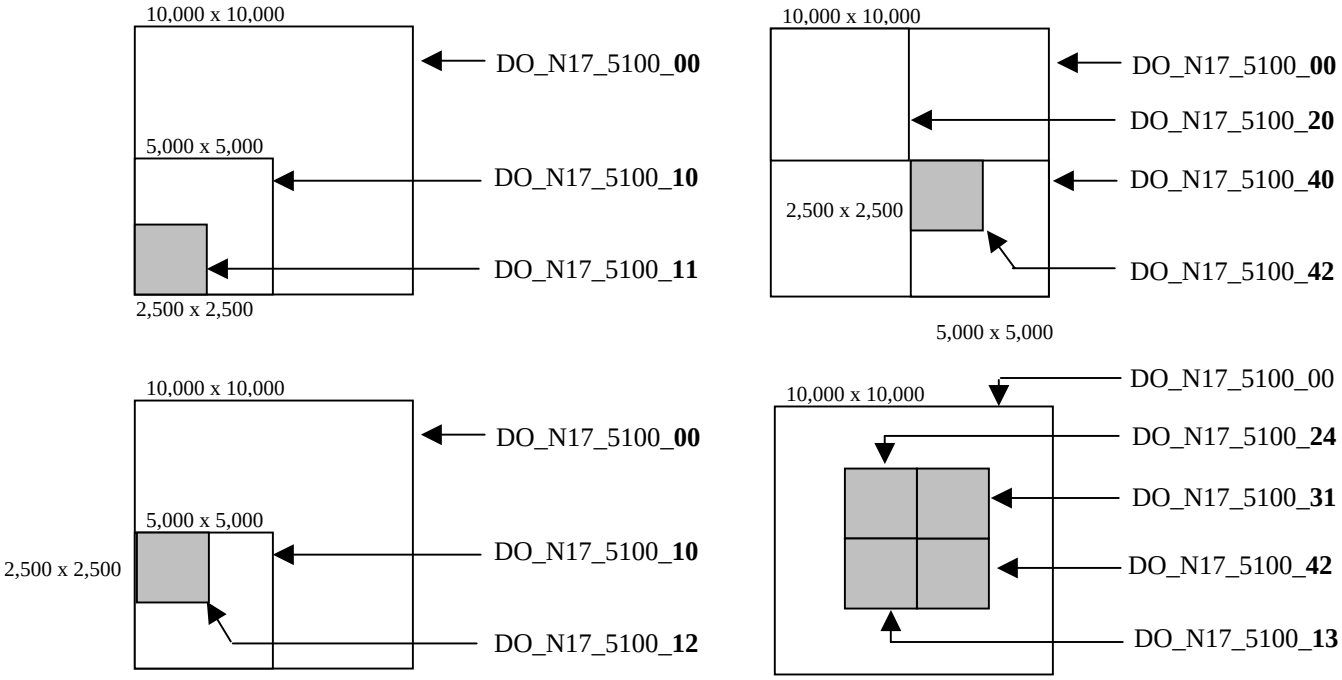
Each 100 Scale tile is numbered relative to the quadrant of the 200 scale tile (5,000' x 5,000') that it occupies. The 100 scale tiles are numbered by adding 1, 2, 3 or 4 to the 200 scale tile suffix starting with the tile occupying the lower left quadrant of the 200 scale tile and increasing in a clockwise direction. Therefore if the 200 scale tile in which the 100 scale tile falls is named (ID) N17_5100_10, then the four 100 scale tiles that might fall within that tile are named (ID) as follows:



200 Scale Tile: N17-5100-**10**

100 Scale Tiles: N17-5100-1**1**
N17-5100-1**2**
N17-5100-1**3**
N17-5100-1**4**

Examples:



Virginia Base Mapping Program (VBMP)
Local Government Product Deliverable

Digital Terrain Model (DTM)

The digital terrain model (DTM) developed for the VBMP is a digital file containing lines (or vector data) and points with 3-dimensional coordinates. The DTM's were developed using a photogrammetric process where overlapping aerial photographs are viewed in stereo or 3-dimensionally. The DTM developed represents a model of the surface of the bare earth (all buildings, trees, etc. having been removed).

Break Lines and Mass

Break Lines

The lines are called break lines and identify breaks in the terrain surface such as the tops and bottoms of banks, ridges and swales. Hydrographic or water features were collected as 3-dimentional break lines as the terrain model was developed and are included in the DTM file.

Break Lines

Mass Points

The points are called mass points and are 3-dimensional elevation points (having X, Y & Z values) spaced across the surface on a regular grid or at random intervals as necessary to properly model the surface being developed.

Mass Points

Note: Orthoimagery for the Virginia Base Mapping Program (VBMP) was developed using a flying height that would support the development of NSSDA standard contours. However, the DTM delivered as part of this project was developed for ortho rectification only. Additional work will be required before the DTM can be used to produce contours to national standards. Provided this additional work is performed, the imagery will support development of NSSDA contours at the following intervals:

1"=100' - 2 ft contours 1"=200' - 5 ft contours 1"=400' - 10 ft contours

Hydrography

For this project hydrograph is considered to include all water features (though some water bodies have a minimum size requirement) that could be seen during the stereo plotting portion or the photogrammetric process. Therefore the rivers and lakes that are identified as hydrography for this project represent what was visible to the analyst in the photography that was acquired in February and March of 2001. Please be aware however, that the stereoplotter technology often allows the analyst to see more than can be easily identified by direct viewing of the photography.

Water features or hydrology is included in the DTM files as 3 dimentional features. These elements can be viewed in ArcView 3.2 by importing the point and line features of the dgn file and mapping the features thematically by level. Documentation of the DTM/Hydro feature levels are included in the DTM metadata files, see below.

Hydrologic Features:

Streams and Rivers. Only streams with visible water will be collected. Streams will be single line up to 8' wide for 100 scale, or 30' wide for 200 and 400 scale. Double lines, representing left and right bank, will be collected where those dimensions are exceeded.

Lakes and Ponds. Lakes and ponds will not be differentiated. Only lakes and ponds with visible water will be collected. The minimum dimension for collection is 100' in length or width.

Canals and Ditches. Canals and ditches will not be differentiated. Only canals and ditches with visible water will be collected. Canals and ditches will be single line up to 8' wide for 100 scale, or 30' wide for 200 and 400 scale. Where those dimensions are exceeded, two lines will be placed, one to represent each bank.

Swamps and Marshes. Swamps and marshes will not be differentiated. Only clearly identifiable swamps and marshes will be collected. The minimum dimension for collection is 1000' in length or width.

Shorelines. Shorelines for the Atlantic Ocean and Chesapeake Bay will be collected at the visible land/water interface. If the shoreline is bordered by tidal marsh, the shoreline will be collected at the land/marsh interface, not the marsh/water interface. Tidal marshes will be collected in Layer 4. The dividing line between a river bank and shoreline will be determined by unambiguous information supplied by VGIN.

Bridges. Bridges crossing a hydrographic feature will be collected as a single point in the center of the hydrographic feature. The elevation of the point will be at the estimated water surface on the high water side of the feature (if it exists).

Dams and Spillways. Manmade dams and spillways will be collected to the extent they are visible and identifiable, and identified as a single point. The elevation of the point will be at the estimated water surface on the high water side of the feature.

Headwall/Culvert. Headwalls and culverts will be collected to the extent they are visible and identifiable, and identified as a single point. The elevation of the point will be at the estimated water surface.

Intermittent features (water not present at time of photo) will not be collected.
No artificial pathways or connectors will be collected.
No flow direction will be indicated, although the breaklines will be in 3D so flow direction may be inferred.
No names or reach codes will be required.
No topological structuring or connectivity is required.
All features will be collected at the visible land water interface.
Edgematching within and between production blocks will be performed.

DTM Data Dictionary **(Including Hydrologic Features)**

DTM **Point** Features

Level Code	**Feature Type**	**DTM Feature**
58	DTM	**Mass Points**: Elevation points of a density and spacing required to adequately model the terrain.
43	Hydro	**Water Point**: Elevation point for water bodies.
4	Hydro	**Dams and Spillways**: Visible manmade dams and spillways identified as a single point. The point elevation is the estimated water surface on the high water side of the feature.
6	Hydro	**Bridge Crossing**: Bridges crossing a hydrographic feature collected as a single point in the center of the hydrographic feature. The point elevation is the estimated water surface elevation.
21	Hydro	**Headwall/Culvert**: Visible headwalls and culverts identified as a single point. The point elevation is the estimated water surface elevation.

DTM **Line** Features

Level Code	**Feature Type**	**Feature**
61	DTM	**Breaklines**: Stereo Compiled lines where changes in slope occur.
7	DTM	**Bridge Apron**: Limit of DTM manipulation for bridge correction.

40	Hydro	**Canals and Ditches**: Canals and ditches with visible water collected using single line up to 8’ wide for 100 scale, or 30’ wide for 200 and 400 scales. Double lines, representing left and right bank, will be collected where those dimensions are exceeded.
41	Hydro	**Shorelines:** Visible shoreline of the Atlantic Ocean and Chesapeake Bay. The marsh line will be on the landward side of the shoreline and the shoreline will extend to the riverbank. The dividing line between shoreline and riverbank was decided by the stereo compiler.
42	Hydro	**Lakes and Ponds:** Lakes or ponds with visible water and a minimum dimension of 100’ in length or width.
44	Hydro	**Streams and Rivers:** Streams and Rivers with visible water collected using a single line up to 8' wide for 100 scale, or 30' wide for 200 and 400 scales. Double lines, representing left and right bank, will be collected where those dimensions are exceeded.
45	Hydro	**Swamps and Marshes**: Clearly identifiable swamps and marshes with a minimum dimension of 1000’ in length or width.
5	Hydro	**Bridges**: Outline of bridge decks.

DTM Polygon **Features**

Level Code	**Feature Type**	**Feature**
5	DTM	**Bridge**: Visible bridge deck
7	DTM	**Bridge Apron**: Extent of DTM manipulation for bridge correct.
?	Hydro	**Water bodies**: Closed water bodies on a single ortho tile.

VBMP Help

VGIN wants to do everything in our power to ensure that all our partners, local governments, state agencies and other users can take full advantage of the Virginia Base Mapping Program's products. As the first VBMP products: digital orthophotography, digital terrain models (DTM), and ancillary data are delivered we know there will be questions. In order to provide help as expeditiously as possible VGIN has set up the following procedures for answering VBMP questions.

Frequently Asked Questions (FAQ):

http://www.vgin.state.va.us/VBMP/VBMP.html

The VGIN web page has a FAQ section where questions from users will be posted along with the answers provided by VGIN staff and partners. We hope that all users will check the FAQ first to see if their question has already been asked and addressed.

Example: VBMP FAQ's

Question: We need 2 foot contours for a pending project. Was the VBMP photography flown low enough to use the pictures and control to produce this mapping?

Answer: Orthoimagery from the Virginia Base Mapping Program (VBMP) is developed at one of three scales depending on population/housing density and local options:

1"=100' scale imagery, .5' ground resolution, flying height 3,600 ft
1"=200' scale imagery, 1' ground resolution, flying height 7,200 ft
1"=400' scale imagery, 2' ground resolution, flying height 14,400 ft

Although the digital terrain model (DTM), and other ancillary data, generated to perform orthorectification on the imagery is being delivered as part of this project, additional work on the DTM would be required to produce contours to national standards. The imagery is generally capable of supporting development of contours at the following intervals, provided this work is done:

1"=100' - 2 ft contours
1"=200' - 5 ft contours
1"=400' - 10 ft contours

The exact areas of coverage by scale for the VBMP can be viewed on our web site (http://www.vgin.state.va.us/VBMP/VBMP.html) under the resource data heading.

Submitting VBMP Questions to VGIN:

VBMP@vgin.state.va.us

Specific questions and/or requests related to VBMP data should be directed to the VGIN staff at the following email address: VBMP@vgin.state.va.us. VGIN staff will make every effort to respond to questions as quickly as possible. We will check emails daily. When appropriate questions and answers will be added to the FAQ section on the VGIN web site.

We highly recommend that for the time being (VGIN staff is very limited) partners check the FAQ section and/or ask questions by email as outlined above. In the event that email is not available or the need is extremely urgent then VGIN's Help voicemail may be reached at **(804) 786-6156**.

Submitting VBMP Questions to VARGIS (VBMP Contractor):

You may also contact the VBMP contractor, VARGIS, about the VBMP products. Questions for VARGIS may include:

- Why are there regional or area differences in the appearance of the orthophotos and DTMs?
- What do I need to do to create contours using the VBMP products?
- Why don't my parcels fit the VBMP orthophotos?
- Can I accurately digitize roads and buildings from the orthophotos?
- How can I measure impervious surface using the VBMP orthophotos?

Questions to VARGIS should be directed to varinfo@vargis.com, or call 1-800-834-0225 and ask for VBMP support. Questions and answers will be added to the FAQ section on the VGIN web site.

The Virginia Base Mapping Program (VBMP)

Licensing Requirements and Procedures (4/01/03)

Background

In October of 2001 the Commonwealth of Virginia began work on the Virginia Base Mapping Program (VBMP). The goal of the VBMP is to establish one consistent, accurate, foundational base map upon which all local government and many regional, state, and federal spatial data applications can be built, producing an efficient statewide geospatial information infrastructure. The first objective of the program was to develop digital orthoimagery for the entire land base of the Commonwealth.

The VBMP digital orthophotography project was funded by the Public Safety Communications Board in order to support statewide implementation of Phase II wireless E911 (E911 for Cell Phones). The VBMP is managed by the Virginia Geographic Information Network (VGIN), a division of the Department of Technology Planning (DTP), under the Commonwealth's Secretary of Technology.

Geospatial data continues to change over time. Therefore it is critical that the VBMP data products are updated on a regular basis to ensure their continued value to all users. To support the sustainability of the VBMP digital ortho products the Virginia General Assembly granted an exemption for the digital ortho project data (digital orthos, digital terrain model, supporting data generated by the project) from the Freedom of Information Act (FOIA). As a result, the products of the VBMP are licensed products wholly owned by the Commonwealth of Virginia. However, all the data will be licensed, free of charge (fees for media copies may apply), for use by all of Virginia's public agencies. Licensing protection will allow the state to enter into agreements with the private sector as partners, hopefully generating revenue that will support the update and maintenance of the digital orthophotography data in the future.

The attached license agreement is designed to protect the VBMP digital orthophotography products from commercial use without permission of the Commonwealth. At the same time the agreement is designed to allow local governments and state agencies in Virginia full use of the data within government applications. If you have any questions about the agreement or use of the data related to the agreement please contact VGIN at: VBMP@vgin.state.va.us

VBMP Orthophotography Data License Agreement for Governmental Users Version 2 and Attachment A – Contractor's Agreement Version 2

The **VBMP Orthophotography Data License Agreement for Governmental Users** replaces prior license agreements distributed to or signed by a jurisdiction. The attached agreement must be signed by the appropriate representative of **all** local government jurisdictions and returned to VGIN.

The **Attachment A – Contractor's Agreement** included with the license agreement, replaces the prior version of the contractor's license agreement. The Contractor's License Agreement is

designed to protect the data but allow access and use of the VBMP data by contractors actively working on projects or contracts for your local government. The Contractors License Agreement must be signed by the local jurisdiction and each contractor that requires access to VBMP digital orthophotography products in order to complete work for the jurisdiction. This agreement ensures that the jurisdiction has full use of the data for all county projects, but protects the data from unwarranted use or access or distribution. **The local government jurisdiction is required to keep all Local Government Contractor Agreements on file and available for review by VGIN upon request.**

Procedure

Print out a copy of the attached license agreement and have it signed by an appropriate representative of your jurisdiction. Signed license agreements must be returned by mail to VGIN at the following address:

VGIN
VBMP Local Government License Agreement
110 South 7th Street, Suite 135
Richmond, Virginia 23219

A signed copy of the license agreement must be received by VGIN before VBMP data can be distributed to a jurisdiction. A fully executed copy of the license agreement, for your records, will be returned by VGIN. It is the responsibility of the local government to retain a copy of the license agreement on file and to make all employees aware of restrictions on access, use, and distribution of VBMP data as contained in the agreement.

Any time the local government wishes to share data with a Contractor to support local government operations, **Attachment A - Contractor's Agreement** must be executed. The Contractor's agreement must be (1) signed by an authorized representative of the Contractor's organization/company and (2) signed and (3) notarized by an authorized representative of the local government to certify that an authorized contractor is using the data exclusively for work authorized by the jurisdiction. Only after a fully executed agreement is on file can the jurisdiction release the specified data to the contractor.

It is the responsibility of the local government to retain a copy of all Contractor license agreement(s) on file for review and audit by VGIN upon request.

Billing for Optional Upgrades

If your locality is one of the 27 communities who participated in an option imagery upgrade, an invoice for the upgrade will be included with the data delivery.

Checks should be made payable to:

The Department of Technology Planning
Virginia Base Mapping Project

Please mail checks to:

Commonwealth of Virginia, Department of Technology Planning
ATTN: Brenda Bolton
110 South 7th Street, Suite 135
Richmond, Virginia 23219

Any questions related to optional upgrade payments should be specific, include complete contact information and be directed to:

Brenda Bolton
Public Safety Communications Division
Department of Technology Planning
bbolton@dtp.state.va.us

VBMP Help

VGIN wants to do everything in our power to ensure that all our partners, local governments, state agencies and other users can take full advantage of the Virginia Base Mapping Program's products. As the first VBMP products: digital orthophotography, digital terrain models (DTM), and ancillary data are delivered we know there will be questions. In order to provide help as expeditiously as possible VGIN has set up three (3) procedures for answering VBMP questions.

1. VGIN will host a number of workshops for the Virginia Base Mapping Program, the first will be scheduled in late March or early April. The workshops will allow users to question VGIN, VARGIS, and other technical specialists on any questions related to the data or its use.

2. VGIN has set up a section on our web site for Frequently Asked Questions (FAQ). In this section questions from users will be posted along with the answers provided. We hope that all users will check the FAQ first to see if their question has already been asked and addressed.

   The VGIN Frequently Asked Questions (FAQ) section is posted at: http://www.vgin.state.va.us/VBMP/VBMP.html.

3. Specific questions and/or requests related to VBMP data can also be directed to the VGIN at the following email address: VBMP@vgin.state.va.us. VGIN staff will make every effort to respond to questions as quickly as possible. We will check emails daily.

4. We highly recommend that for the time being (VGIN staff is very limited) partners check the FAQ section and/or ask questions by email as outlined above. In the event that email is not available or the need is extremely urgent then VGIN's Help voicemail may be reached at **(804) 786-6156**.

Virginia Base Mapping Program (VBMP)
VBMP Orthophotography Data
License Agreement for Governmental Users

This is a license agreement (the "License Agreement") between the Commonwealth of Virginia (the "Commonwealth"), through the Virginia Geographic Information Network Division of its Virginia Information Technologies Agency ("VGIN"), and _____, a Virginia governmental entity with its main office at _____ ("Licensee"), relating to the Commonwealth's provision of orthophotographs of Virginia area regions and related data to Licensee. The parties agree as follows:

1. Definition of "Data": As used in this License Agreement, "Data" means some or all of the digital orthophotography, digital terrain models and ancillary data which has or will be produced by the Virginia Base Mapping Program, as well as any orthophotographs derived therefrom, whether in printed or electronic form. "Orthophotographs" are understood to be photo-like images, and do not include line drawings created by Licensee that lack a photo-like image or digital data created by Licensee that do not convey a photo-like image.

2. Delivery of Data. As soon as practicable after execution of this License Agreement, the Commonwealth shall provide Licensee with Data selected by the Commonwealth, and from time to time, may provide (or allow others to provide) Licensee with additional or replacement Data. Licensee will sign an acknowledgement form provided by the Commonwealth to identify the Data provided. The Data as provided will be marked with the proprietary notice referred to in section 4 below. The Commonwealth may require payment of a fee for media and transfer costs. These costs will not exceed the actual cost incurred by the Commonwealth and will be detailed in advance if requested.

3. **Use and Disclosure**. Licensee shall not disclose or permit disclosure of Data to any entity or individual, except as follows:

   a. **Employees**: Licensee may disclose Data to its own employees, to be used solely for Licensee's official governmental purposes, provided all other provisions of this License Agreement are met;

   b. **Other Virginia Public Sector and Non-Profit Licensees**: Licensee may disclose Data to employees of another Virginia public body or Virginia Non-Profit entity, but only if:

      i) The other public body or non-profit entity is included in VGIN's list of "Virginia Public Sector and Non-Profit Licensees of VBMP Data," which list is accessible through VGIN's website (http://www.vgin.state.va.us);

      ii) Licensee obtains and retains for the Commonwealth a signed acknowledgement from the recipient public body or non-profit entity which: (a) identifies all the Data provided, (b) acknowledges receipt of the Data and the date the data were received, and (c) acknowledges that all the data so received are property of the Commonwealth of Virginia and constitute

"Data" as that term is used in the recipient public body's or non-profit entity's agreement with VGIN for licensing VBMP Orthophotography Data, and

iii) All other requirements of this License Agreement have been met.

c. **Contractors**: Licensee may disclose Data to employees of a contractor, to be used solely to perform contract work for Licensee, but only if the following prerequisites are met:

i) The Data to be disclosed are only those that will be used for specific project(s) on which work is ready to begin. For example, it is not permissible to disclose Data to a contractor for projects that might or might not be ordered;

ii) Licensee and its contractor have signed the attached form agreement entitled "Attachment A – Contractor's Agreement", with no changes or additions to the form and all information correctly filled in;

iii) Licensee keeps the signed Contractor's Agreement form on file at all times; and

iv) All other requirements of this License Agreement are met.

After completion of the work for which the Data were needed, Licensee shall follow the Commonwealth's instructions for assuring that the contractor retains no copy of the disclosed Data.

d. **Hardcopy Prints of VBMP Data**: Licensee may disclose hardcopy maps or prints of VBMP Data, provided all other requirements of this License Agreement are met. Without limiting the forgoing, in accordance with Section 4 of this License Agreement, all hardcopy products must include the following notice: "Aerial Imagery © 2002 Commonwealth of Virginia."

e. **Data Duplication**: Licensee may provide Data to a duplicating service contractor solely for the purpose of having the Data copied onto DVDs, CDs or other media for Licensee, but only if the following prerequisites are met:

i) In accordance with Section 4 of this License Agreement, the proprietary notice specified in that section is permanently attached to or marked on each DVD, CD or other media onto which any Data are copied;

ii) The duplicating service contractor, for the benefit of the Commonwealth of Virginia, agrees to promptly turn over all copies of Data to the Licensee, agrees not to use or retain any copy of any Data, and agrees that venue for

any dispute pertaining to the Data shall be solely in Richmond, Virginia; and

iii) All other requirements of this License Agreement have been met.

NOTICE TO DUPLICATING SERVICE CONTRACTOR: The Commonwealth of Virginia gives you its permission to make DVD, CD or other copies of the Commonwealth's proprietary Data for the Licensee identified at the beginning of this License Agreement, provided that prerequisites (i) and (ii) above are met and you promptly follow through on delivering all copies of the Data to the Licensee. If you have any question and you wish to contact the Commonwealth, please call or write to: Virginia Geographic Information Network, 110 S. Seventh St., Suite 135, Richmond, Virginia, 23219 (804) 786-8175.

f. **Internet Display of Reduced Resolution Images**: Images that are derived from Data may be displayed by Licensee on a Licensee-owned or Licensee-controlled Internet web site, but only if the following prerequisites are met:

i) Each part of the displayed image must have a lower resolution than the original Data from which that part of the image was derived. Specifically, original Data of 6-inch resolution can never be displayed at a resolution finer than 1 foot. Original Data of 1-foot resolution can never be displayed at a resolution finer than 2 foot. Original Data of 2-foot resolution can never be displayed at a resolution finer than 3 foot. Original Data of 1-meter resolution can never be displayed at resolution finer than 4 foot.

ii) Any Licensee that has the boundaries of a military installation within its borders must notify VGIN of the data display plan for geographic areas within the boundaries of the military installation and, upon request by VGIN, provide contact information for the military installation. Licensee shall comply with all applicable laws, rules and regulations.

iii) Licensee shall not authorize the web site visitor to make a digital copy of the displayed image or any part of the image. Licensee shall not provide the web site visitor with any capability to make a digital copy of the displayed image in whole or in part, except that Licensee is not required to prevent copy-to-clipboard, screen-print, or other functions that are commonly available in user systems and not preventable at the web site.

iv) The following statement must be included in any map display using VBMP data "Aerial Imagery © 2002 Commonwealth of Virginia".

v) If the web site is hosted by an independent contractor hired by Licensee, the requirements of Section 3(c) above must also be met.

vi) Licensee must give VGIN advance written notice of the Internet address and primary contact information of any web site that will display the Data; and

vii) All other requirements of this License Agreement have been met.

g. **Intranet Display of High Resolution Images**: Licensee may allow persons other than its own employees to use Licensee's Intranet to view Data-derived images having a finer resolution than prescribed above in section 3(f), but only if Licensee has security systems in place which make it absolutely impossible for non-employees to obtain an electronic copy of Data from the Intranet, and access is only available on site, and all other requirements of this License Agreement are met. Without limiting the foregoing, a security system that depends on human monitoring of the non-employee's activity is not sufficient. In regard to allowing hardcopies of the Data, see Section 3.d.

If Licensee wants to use or disclose Data other than as expressly authorized above, Licensee must first obtain a signed written consent from VGIN which expressly details the specification and procedures for the additional use or disclosure and expressly consents to such use or disclosure. VGIN will accept requests for such consent after April 30, 2003.

4. Proprietary Notice. Licensee may make copies of the data. Licensee shall ensure that all copies of Data include the following notice: "Aerial Imagery © 2002 Commonwealth of Virginia." For digital copies having data resolution finer than that allowed by section 3.f.(i) the above notice shall also include the following: "The data contained herein are the property of the Commonwealth of Virginia. Distribution of any of these data to anyone not licensed by the Commonwealth is strictly prohibited." The above notice shall be affixed to the copy in a manner and location sufficient to give reasonable notice to users of the copy.

5. Reporting Errors to the Commonwealth. The Commonwealth has acquired the Data from a private sector firm. The contract required the contractor to use procedures designed to produce data to National Standard for Spatial Data Accuracy (NSSDA) Standards. The contractor also provided a warranty to repair or replace certain Data at no charge to the Commonwealth if relevant errors are reported to the contractor by September 30, 2003, and in some cases, a later deadline. The Commonwealth will provide guidelines for reporting any errors Licensee may discover in Data provided by the Commonwealth. The Commonwealth requests that any such errors be promptly reported to the Commonwealth to maximize the Commonwealth's opportunity to obtain correction of the errors under warranty. Nothing herein shall be construed as obligating the Commonwealth to correct or obtain correction of any errors, however.

6. No Liability for Errors. The Commonwealth cannot assume responsibility for any inaccuracies in the Data, nor can the Commonwealth undertake to correct or notify Licensees of any errors that may be called to the Commonwealth's attention before or after the Commonwealth's delivery of the relevant Data to Licensee. **Accordingly, all Data provided hereunder are provided "AS IS."** Without limiting the foregoing, any liability of the Commonwealth, its officers, agents and employees in connection with this License Agreement shall be limited to no more than the fees the Commonwealth received from Licensee in connection with this Agreement, and the Commonwealth, its officers, agents and employees shall have no liability for lost profits, consequential damages or for any lawsuits filed against Licensee or its personnel in connection with any Data. Licensee agrees it will not use or allow use of Data in any setting which could subject the

Commonwealth or its personnel to liability for inaccuracies in the Data, or for failure to provide adequate information about the Data.

7. Security and Record Keeping. Licensee shall implement security measures sufficient to ensure, and shall maintain records sufficient to demonstrate, its compliance with all requirements of this License Agreement, particularly the requirements in sections 3 and 4 above**. Without limiting the foregoing obligation, the Commonwealth in its discretion may prescribe and amend security measures and record keeping formats to be followed by Data Licensees as part of their overall security and record-keeping program.** Licensee shall promptly make its records available to inspection if the Commonwealth requests such access.

8. Termination. The Commonwealth may terminate this license in writing: (a) **if the Commonwealth adopts a new standard license agreement to be used for licensing of Data to Virginia governmental entities and Licensee does not agree to the new version within 30 days after its adoption by the Commonwealth;** or (b) if the Commonwealth concludes in good faith that Licensee has failed to fully comply with the current License Agreement and the matter is not resolved to the Commonwealth's satisfaction within 30 days after the Commonwealth gives Licensee written notice of its intent to terminate. In the event of termination under this section, unless otherwise directed by VGIN in writing, Licensee shall return all original media and destroy all copies of Data in its possession or control, except Licensee may maintain any hardcopy prints made under section 3(d) of this agreement. If the Commonwealth elects not to terminate one or more licenses in circumstances (a) or (b) above, or terminates licenses but chooses to allow some continued use or otherwise allows exceptions from its standard license agreement, such action shall not be construed as negating the "standard" nature of its license agreement or as otherwise limiting its rights under clause (a) above. Licensee certifies that its record retention and disposition schedules under the Public Records Act or other applicable law permit Licensee to carry out the provisions of this section and will be maintained at all relevant times to preserve Licensee's ability to perform its obligations under this Section.

9. Freedom Of Information Act. Licensee's attention is directed to Item 468.C of Chapter 899 of the 2002 Acts of Assembly, which provides an exemption from the Freedom Of Information Act and similar laws. This special exemption may duplicate other protection available under current or future statutes.

10. Rights in Data. This License Agreement grants Licensee a limited, nonexclusive license to use and disclose Data to the extent permitted by this License Agreement. Licensee acquires no intellectual property or other interest in any Data, including, without limitation, in any orthophotographs derived therefrom, whether in printed or electronic form. Licensee may claim ownership in line drawings created by Licensee if the line drawing does not present a photo-like image.

11. Disputes: Contractual claims shall be processed in accordance with the procedure in Va. Code § 2.2-4363. The public body receiving a contractual claim shall issue its final decision on the claim within ten days after it is submitted.

12. Payment: The contractual clauses required in Va. Code § 2.2-4354 are incorporated herein by reference.

13. Miscellaneous. This is the complete and final expression of the parties' License Agreement and can be modified only in a writing signed by both parties. Any waiver of a provision of this License Agreement shall be void unless in writing and signed by the waiving party. Any waiver shall be interpreted to apply only to the past unless it expressly states that it applies to the future. Any attempt by Licensee to assign this License Agreement without the Commonwealth's prior written consent shall be void. If any provision of this License Agreement is unenforceable, this shall not affect the validity of the rest of this License Agreement, but the provision in question shall be limited or construed in a manner to accomplish as much of the intent of the provision as legally possible. This License Agreement shall be governed in all respects by Virginia law, and any dispute associated with this License Agreement or any Data shall be heard only in Virginia courts.

This license agreement supersedes the license agreement between the parties signed on _____ (date).

THE UNDERSIGNED representative of each party hereby represents and warrants that he is duly authorized to sign this License Agreement on behalf of the party indicated, and that such party does hereby sign this License Agreement, intending to be bound:

_____ (Licensee)	COMMONWEALTH OF VIRGINIA
By: _____	By: _____
Printed name: _____	Printed name: _____
Title: _____	Title: _____
Date: _____	Date: _____

Attachment A - Contractor's Agreement

This is an agreement between the Virginia governmental or non-profit entity specified below and _____ (the "Contractor"), a corporation organized under the laws of the state of _____, and having its office at _____. This agreement ("Contractor's Agreement") is made in connection with Contractor receiving orthophotography data belonging to the Commonwealth of Virginia. For good and valuable consideration, receipt of which is hereby acknowledged, the undersigned Contractor and governmental entity hereby agree as follows:

1. This Contractor's Agreement is attached to a Virginia Base Mapping Program (VBMP) Orthophotography Data License Agreement for Governmental and Non-Profit Users dated _____ (the "License Agreement") between the Commonwealth of Virginia (the "Commonwealth"), through the Virginia Geographic Information Network Division of its Virginia Information Technologies Agency ("VGIN"), and _____, a Virginia governmental or non-profit entity with its main office at _____ ("Licensee"). In this Contractor's Agreement, all terms shall have the same meaning as they have in the attached License Agreement.

2. Contractor represents to the Commonwealth that Contractor has a contract with Licensee to perform a specific project, as referred to in section 3(c) of the attached License Agreement, and that performance of that contract requires that Contractor have access to Data belonging to the Commonwealth. The Data to be used in the performance of that contract are identified as follows (fill in the geographic extent of the data): _____ _____ _____. The contract requiring use of the above Data is identified as follows (fill in the contract number, title of contract, parties and date signed): _____ _____ _____.

3. Licensee agrees to provide, and Contractor hereby acknowledges its receipt of, the above Data from Licensee. Contractor represents and warrants to the Commonwealth that the media on which Contractor is receiving the above Data contain the proprietary notice required under section 4 of the attached License Agreement.

4. To perform the contract, Contractor represents that it will need access to the Data until (insert date): _____.

5. Contractor acknowledges that the Data provided to it are the property of the Commonwealth of Virginia and are provided to Contractor solely for the purpose of performing its contract work for Licensee. Contractor shall not disclose the Data to any person or entity other than its own employees, and shall ensure that its employees use the Data solely for purposes of performing Contractor's contract with Licensee.

6. **With respect to the Data, which it receives from Licensee, Contractor agrees that Contractor is bound to all the restrictions, obligations, limitations of liability and all other provisions of the License Agreement to the same extent as they apply to the Licensee, and all such provisions are hereby incorporated into this Contractor's Agreement by reference.**

7. Notwithstanding the preceding section, Contractor acknowledges it shall have none of Licensee's rights under the License Agreement. For example, Contractor has no right to make further disclosure of Data to the public or to any subcontractor under section 3 of the License Agreement.

8. Contractor's right to possession of the Data may be terminated by the Commonwealth at any time upon 30 days' written notice, or upon the expiration of the period specified in section 4 above, whichever is earlier. Upon request by Licensee or the Commonwealth, Contractor shall follow the Commonwealth's instructions for documenting its compliance with this Contractor's Agreement and for documenting that it has not retained any copy of the Data after its right to possession of the Data has expired or been terminated.

9. Contractor acknowledges that **the Data are provided "AS IS"**. The Commonwealth, its agents, officers and employees make no warranty whatsoever regarding the accuracy, suitability or attributes of the Data. Contractor shall indemnify and hold the Commonwealth, its officers, agents and employees harmless from any and all claims, liability, cost and expense arising from Contractor's use of the Data. Contractor further acknowledges that, unless Licensee in a separate agreement has specifically agreed otherwise, the Licensee and Licensee's agents, officers and employees also provide the Data "AS IS" and make no warranty whatsoever regarding the accuracy, suitability or attributes of the Data, and Contractor shall indemnify and hold Licensee, its officers, agents and employees harmless from any and all claims, liability, cost and expense arising from Contractor's use of the Data.

10. Contractor and Licensee agree that this Contractor's Agreement is for the benefit of the Commonwealth (and where applicable, its officers, agents and employees) and may be enforced directly by them. This Contractor's Agreement is also for the benefit of, and may be enforced by, the Licensee and Contractor.

11. No changes or additions to this form agreement are authorized. If any changes are made on this form, Contractor must refuse to receive the Data. To be authorized, any changes must be made in a writing signed by a duly authorized employee of VGIN (not an employee of Licensee). Similarly, after execution of this form by Contractor, any modification or waiver of the Commonwealth's rights hereunder shall be void unless made in writing by an authorized employee of VGIN.

12. This is the complete and final expression of the parties' agreement.

THE UNDERSIGNED representatives of the parties each hereby sign and seal this Contractor's Agreement on behalf of their respective principals, intending to be bound:

_____ (Contractor)

By: _____

Printed name: _____

Title: _____

Date: _____

ACKNOWLEDGEMENT

COMMONWEALTH OF VIRGINIA, CITY/COUNTY OF _____, to-wit:

The foregoing Contractor's Agreement dated _____was acknowledged before me this_____ day of _____, 200__, by _____ (name of officer), _____ (title of officer) of _____ (name of Contractor), on behalf of that Contractor.

(SEAL)_____Notary Public

My commission expires _____

_____(Virginia Governmental or Non-Profit Entity)

By: _____

Printed name: _____

Title: _____

Date: _____

Notice to VBMP Product Recipients Regarding Warranty

The VBMP Products are warranted to VGIN by VARGIS, the production contractor, for six months following delivery to VGIN. VARGIS will repair or replace any products that are not in compliance with project specifications.

VGIN and VARGIS have established Acceptance Criteria governing the review of VBMP products. Those criteria are attached in **Section 10**. All products have gone through three quality assurance checks against these criteria; one by VARGIS' production subcontractors, one by VARGIS, and one by VGIN's QA contractor, Dewberry & Davis. Delivered products have passed all three checks. The recipient is not advised or compelled to perform their own review, but may, in normal use, find characteristics that they feel are not within their expectations.

Measurements of Compliance

If a recipient believes that a VBMP product is not within specification, they should first check the questionable characteristic against the Acceptance Criteria before submitting a claim against the warranty.

Visual inspections must be performed with the display zoom set at the target map scale. Anomalies that are not apparent at the target map scale are acceptable even if they are clearly visible at higher levels of zoom.

Measurements of accuracy generally require statistical sampling and photogrammetric expertise. A single measurement that is outside of the acceptable limits in the criteria does not necessarily indicate non-compliance. The criteria only apply to unambiguous measurements on clearly defined features.

Claims Process

If a recipient or user of the VBMP products believes that a product does not meet the project specifications, and has evaluated the product against the Acceptance Criteria, they may submit a request for review. Submissions should include complete information, including tile name, location within tile, nature of the problem and the relationship to the Acceptance Criteria. A screen shot (jpg or bmp) is also helpful.

The request for review should be sent by email to varinfo@vargis.com or by mail to VBMP Warranty, c/o VARGIS, 208 Elden Street, Herndon, VA, 20170. If VARGIS agrees, repair or replacement will occur within 30 days. If VARGIS disagrees, the claim will be sent to VGIN for mediation.

VGIN AND VARGIS MAKE NO OTHER WARRANTY, EXPRESS OR IMPLIED, AND DISCLAIM ALL IMPLIED WARRANTIES OF MERCHANTABILITY, INTEGRATION, TITLE AND FITNESS FOR A PARTICULAR PURPOSE.
IN NO EVENT SHALL VGIN OR VARGIS BE LIABLE, WHETHER IN CONTRACT, TORT (INCLUDING NEGLIGENCE) OR OTHERWISE, FOR ANY INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES.

VIRGINIA BASE MAPPING PROGRAM
DATA WARRANTY CLAIM FORM

Instructions: Please complete all non-shaded sections of this form to ensure prompt claim processing. Fax form to 703-318-7224 or email varinfo@vargis.com. Thank you.

Organization Name/Customer Name:	***Contact & Phone Number:***	***Email:***	***Date Submitted:***
Project Name Virginia Base Mapping Program (VBMP) Commonwealth of Virginia Department of Technology Planning Virginia Geographic Information Network	Project Ref. No. Contract #137-02-04	VARGIS Contact Info VARGIS LLC 208 Elden Street, Suite 204 Herndon, VA 20170 Varinfo@vargis.com	Phone 800-834-0225 Fax 703-318-7224

Check all boxes that apply:

Product Description	❑ Digital Terrain Model	❑ Digital Ortho Tile VA State Plane (N/S)	❑ Raw Scan Data
	❑ 1 Meter Digital Ortho	❑ MrSID Compressed Digital Ortho Tile VA State Plane (N/S)	❑ Ancillary Data DVD
Problem Report Area:	❑ Media	❑ File format	❑ Data Error
	❑ Data Accuracy	❑ Projection/Units	❑ Other

List the acceptance criterion number the product fails to comply:

Failed Acceptance Criterion :	
Full Description of problem or media error:	

Do not write in this section. For VARGIS Use ONLY.

Date Received:_____	Assigned to:_____
Routing: ☐PM ☐Production ☐Technical Services Resolution Description:	Action:
Date Resolved:	

VARGIS LLC
Varinfo@vargis.com
Call for assistance: (800) 834-0225

Virginia Base Mapping Program (VBMP)
Local Government Product Deliverables

Quick Reference VBMP Product Specifications

Conformance to Standards: VBMP digital orthoimagery meets or exceeds accuracy requirement for:

- Class 1 mapping standards in conformance with Virginia Map Accuracy Standards (1992) and
- ASPRS (1990) Accuracy Standards for Large-scale Maps, **Class 1.**

Method of Collection: Traditional Aerial Photography Film exposed with a 6" focal length aerial photography Camera. Airborne GPS was used onboard the aircraft. Image scans were produced from the Photographic film.

Imagery Type: True Color (24 bit)

Orthophotography Extent: Orthoimagery for the Virginia Base Mapping Program (VBMP) was developed over the entire land area of the Commonwealth. The State boundary was buffered by a minimum of 1000'. Land areas adjacent to the Atlantic Ocean and Chesapeake Bay were buffered by 1000' or the extent of man-made features extending into the bay (with the exception of the Chesapeake Bay Bridge Tunnel(s)).

Time Period of Collection: Spring of 2002, leaf-off conditions

Orthophotography Scale and Tile Size: Orthoimagery for the Virginia Base Mapping Program (VBMP) was developed at one of three scales depending on population/housing density and local options:

Resolution	Imagery Scale	Flying Height	Ortho Tile Size
½ foot	1"=100'	3,600 feet	2,500' x 2,500'
1 foot	1"=200'	7,200 feet	5,000' x 5,000'
2 foot	1"=400'	14,400 feet	10,000' x 10,000'

Product Orientation:

Horizontal Datum:	NAD 83/93 (HARN)
Vertical Datum:	NAVD 88 vertical datum with NGS Geoid 99 model used in derivation of orthometric heights.
Coordinate System:	Virginia State Plane North and South zones
Units:	US Survey Feet.

Virginia Base Mapping Program (VBMP)
Local Government Product Deliverables

Acceptance Criteria for Final Deliverables

The final products for the Virginia Base Mapping Program (VBMP) have been tested to insure that they have met or exceeded the following criteria prior to acceptance by the Commonwealth. Testing to verify compliance with these acceptance criteria was performed by VARGIS through their internal QA processes and the independent Dewberry and Davis QA processes prior to acceptance of the final products by the Commonwealth. This criteria represents guidelines and it is understood that variances and/or exceptions may be required. Exceptions shall be made by mutual consent and must be documented in writing.

NOTE: Each tested characteristic has been numbered sequentially to aid in communication between VGIN, VARGIS, and Dewberry. Refer to the numeric ID when discussing a specific tested characteristic.

Digital Orthophotography Acceptance Criteria

	Tested Characteristic	**Measure of Acceptability**
All Scales (100, 200 & 400)		
1.	Media: DVD 2.0, 4.7 GB single sided (4.3 GB usable)	Media is readable, all files accessible, no files corrupted
2.	Media label	Conforms to VARGIS template with proper volume ID
3.	File organization	Files written in tile sheet order
4.	File name	Conforms to required convention
5.	TIFF & .tfw format	File reads in ESRI and Intergraph
6.	*GeoTiff format (does not apply to ortho producer)*	**Geotiff 6.0 compliant; reads in ESRI and Intergraph**
7.	Pixel definition	World file must reference the center of the pixel located in the upper left hand corner of the tile as the point of origin.
8.	Georeferencing	World file has correct coordinates expressed to at least 2 significant digits, and correct pixel size and pixel count
9.	*MrSID mosaics (does not apply to ortho producer)*	*Correct compression ratio,18:1, reads in ArcView*
10.	Projection	Virginia North State Plane – 4501 (tile respective zone) Virginia South State Plane- 4502 (tile respective zone)
11.	Datum	NAD 83/93 (HARN) reference datum
12.	Units	U.S. Survey Feet
13.	24 bit natural color	256 levels of value for each band, 0=black, 255=white
14.	Tonal quality	< 2 percent of values at 0 or 255
15.	Image blemishes and artifacts	Generally acceptable within these limits: If 1 pixel wide, 100 pixels in length. If 2 pixels wide, 60 pixels in length. If 3 pixels wide, 20 pixels in length. If 4 - 12 pixels wide, 12 pixels in length. Artifacts exceeding these limits may be acceptable if ground feature detail is not obscured, or if the

		brightness value of the pixels in the artifact is under 170. Artifacts within these limits may be rejected if critical ground features are significantly impacted. Critical features shall be defined as features having County, State or National significance (i.e. Courthouses, Capitol Buildings, etc.). Clusters of artifacts that do not individually meet these criteria may be considered unacceptable if more than 12 are visible within a viewing screen at 1:1 zoom. (5 or more artifacts within a 200 pixel area preferred).
16.	Conformance of sheet to index grid	Sheet matches grid, no gaps between tiles at 1:1 view.
17.	Image Appearance	All reasonable efforts should be taken to remove appearance of vignetting by auto dodging. Radiometry quality consistent with established radiometry samples. The difference in average pixel values on either side of a mosaic seamline should generally not exceed 70 (30 prefered), when measured on a homogeneous surface with similar characteristics (water surfaces are exempt from this requirement). Greater differences may be allowed if the correction will cause significant degradation of the image content on either side.
18.	Scratches	See image blemishes
19.	Smears	See image blemishes. Corrected by adding mass points or breaklines to DEM as necessary to reflect actual terrain or by image processing where appropriate. Where DTM corrections or image processing will result in reduced horizontal accuracy or misrepresentation of the location or appearance of important features (buildings, roads, etc.), the smear will remain untreated.
20.	Wavy features	95% of distinct linear ground features (such as road markings, and curbs) should not deviate from their apparent path by more than5 pixels measured perpendicular to the feature within any 100 pixel distance measured along the feature length. On roads, measurements should be taken from centerline of road instead of road edges, shoulder and railings.
21.	Mosaic lines	No mosaic lines through buildings. No mosaic lines through above ground transportation structures carrying automobiles or trains unless unavoidable.
22.	*Metadata (does not apply to ortho producer)*	*Complies with standard (to be determined)*
1"=400'-scale only		
23.	Ground Resolution	2.0 US Survey Feet
24.	Sheet size	10,000' (5,000 pixels) E-W by 10,000' (5,000 pixels) N-S
25.	RMSE of known ground points measured on the image *See ASPRS Class I Standards Page 8, Table 16, and NSSDA Part 3, Appendices 3-A and 3-D for explanation of formulas.*	$RMSE_x = RMSE_y$ = 4' (2 pixels) or $RMSE_{r =} = 1.4142*RMSE_x = 1.4142*RMSE_{y =}$

		5.657’
26.	Absolute accuracy	NSSDA accuracy (20+ points) such that 1.73 * $RMSE_r$ < 9.8’
27.	Mismatch of features along mosaic lines and production block boundaries of equal scale	Equal to or less than 3 pixels on well defined ground features (roads, sidewalks, curbs).
28.	Mismatch of features between 400 & 200 scale	Equal to or less than 6 feet on well defined ground features (roads, sidewalks, curbs). 8 foot maximum on all measurable features.
1”=200’-scale only		
29.	Ground Resolution	1.0 US Survey Feet
30.	Sheet size	5,000’ (5,000 pixels) E-W by 5,000’ (5,000 pixels) N-S
31.	RMSE of known ground points measured on the image *See ASPRS Class I Standards Page 8, Table 16, and NSSDA Part 3, Appendices 3-A and 3-D for explanation of formulas.*	$RMSE_x = RMSE_y$ = 2’ (2 pixels) or $RMSE_{r =} = 1.4142*RMSE_x = 1.4142*RMSE_{y =}$ 2.8284
32.	Absolute accuracy	NSSDA accuracy (20+ points) such that 1.73 * $RMSE_r$ < 4.9’
33.	Mismatch of features along mosaic lines and production block boundaries of equal scale	Equal to or less than 3 pixels on well defined ground features (roads, sidewalks, curbs).
34.	Mismatch of features between 200 & 100 scale	Equal to or less than 3 feet on well defined ground features (roads, sidewalks, curbs). 4 foot maximum on all measurable features.
1”=100’-scale only		
35.	Ground resolution	0.5 US Survey Feet
36.	Sheet size	2,500’ (5,000 pixels) E-W by 2,500’ (5,000 pixels) N-S
37.	RMSE of known ground points measured on the image *See ASPRS Class I Standards Page 8, Table 16, and NSSDA Part 3, Appendices 3-A and 3-D for explanation of formulas.*	$RMSE_x = RMSE_y$ = 1’ (2 pixels) or $RMSE_{r =} = 1.4142*RMSE_x = 1.4142*RMSE_{y =}$ 1.4142’
38.	Absolute accuracy	NSSDA accuracy (20+ points) such that 1.73 * $RMSE_r$ < 2.4’
39.	Mismatch of features along mosaic lines and production block boundaries of equal scale	Equal to or less than 3 pixels on well defined ground features (roads, sidewalks, curbs).
40.	Mismatch of features between 100 & 400 scale	Equal to or less than 5 feet on well defined ground features (roads, sidewalks, curbs). 7 foot maximum on all measurable features.

Aerotriangulation Acceptance Criteria

	Tested Characteristic All Scales	**Measure of Acceptability**
41.	Report Format	Conforms to required convention
42.	Report Completeness	All information complete and readable
43.	Precision of Image Observations	Sigma (0) less than or equal to 5 microns is acceptable. Over 5 microns is subject to review.

44.	Horizontal accuracy against ground control	RMSE values are acceptable up to 0.3', 0.6' and 1.2' for the 100 scale, 200 scale and 400 scale AT blocks respectively in the X and Y direction. Higher RMSE values are subject to review.
45.	Vertical accuracy against ground control	RMSE values are acceptable up to 1/10,000 of flying height, or 0.36', 0.72' and 1.44' for the 100 scale, 200 scale and 400 scale AT blocks respectively. Higher RMSE values are subject to review.
46.	Accuracy against image coordinates	RMSE less than or equal to 5 microns is acceptable. Over 5 microns is subject to review.
47.	Offsets [E, N] to any one blind QA point	2 * RMSE for that scale
48.	NSSDA analysis [E, N] of 20+ QA points	95% within 1.73 * RMSE for that scale

ABGPS Acceptance Criteria

	Tested Characteristic All Scales	**Measure of Acceptability**
49.	ABGPS centers	"The average of the RMSE of GPS coordinates at the exposure stations for any given flight mission shall be less than 10 cm and the following limits will be observed to insure that individual exposure station RMSEs are held within reasonable limits: 95% of the individual RMSEs are also less than 15 cm; 99% of the individual RMSEs are less than 20 cm"

Ground Control Acceptance Criteria

	Tested Characteristic All Scales	**Measure of Acceptability**
50.	Report Format	Conforms to required convention
51.	Report Completeness	All information complete and readable
52.	Horizontal accuracy against HARN control	Standard deviation to existing control within 5-7 cm.
53.	Vertical accuracy against HARN control	Standard deviation to existing control within 5-9 cm.
54.	Offsets [E, N] to any one blind QA point	2 * Standard deviation
55.	NSSDA analysis [E, N] of 20+ QA points	95% within 1.73 * RMSE for that scale

Digital Terrain Model QA Acceptance Criteria

	Tested Characteristic All Scales	**Measure of Acceptability**
56.	Media DVD 2.0, 4.7 GB single sided (4.3 GB usable)	Media is readable, all files accessible, no files corrupted
57.	File organization	Files written one per ortho delivered
58.	File name	Conforms to required convention
59.	Format	DGN, all features have x, y, z values
60.	Georeferencing	Locates in proper tile grid cell
61.	Breaklines & mass point locations	Sufficient to accurately build terrain to support

		ortho
62.	Mass point locations	Tops, bottoms, and supplementing breaklines as needed for orthorectification, none in open water. Water bodies level.
63.	Continuity	No spikes or holes, no gaps of sufficient size to affect orthorectification, regardless of perspective center.
64.	Attributes	Conform to DTM standard

Ancillary Data Acceptance Criteria

	Tested Characteristic All Scales	Measure of Acceptability
65.	Raw Scan media: DLTIV, Unix TAR DLT 7000 block size 128 or DVD 2.0, 4.7 GB single sided (4.3 GB usable)	Media is readable, all files accessible, no files corrupted
66.	Raw Scan File organization	Index shp file provided with each media delivered
67.	Raw Scan File name	Roll (4 digits max) Frame (3 digits max) ex: L002110
68.	Raw Scan Format	TIFF JPG format; Q factor of 10
69.	Raw Scan Resolution	21 microns
70.	Original Film	Good condition; undamaged; completeness
71.	DAT Orientation Parameters	Conform to established standard output convention

Hydrographic Features Acceptance Criteria

	Tested Characteristic All Scales	Measure of Acceptability
72.	Media DVD 2.0, 4.7 GB single sided (4.3 GB usable)	N/A, embedded in DTM file.
73.	File organization	N/A, embedded in DTM file.
74.	File name	N/A, embedded in DTM file.
75.	Format	N/A, embedded in DTM file.
76.	Georeferencing	N/A, embedded in DTM file.
77.	Level	All features are on the correct level (see list below).
78.	Completeness	All hydrographic features listed below are collected if they contain visible water and meet the corresponding size criteria. Where no size criteria are listed, the maximum allowable omissions are ¼" at map scale in length and/or width.
79.	Accuracy	Features appear within 3 pixels of the same clearly identifiable feature on the orthophotos with 90% confidence.
80.	Continuity	Lines appear continuous at map scale except where a feature is hidden (passes underground or under a structure). There are no artificial gaps or mismatches in excess of $1/30^{th}$ inch at map scale (including model boundaries, tile boundaries and production boundaries).

Level 44 - Streams and Rivers. Only streams with visible water will be collected. Streams will be single line up to 8' wide for 100 scale, or 30' wide for 200 and 400 scale. Double lines, representing left and right bank, will be collected where those dimensions are exceeded.

Level 42 - Lakes and Ponds. Lakes and ponds will not be differentiated. Only lakes and ponds with visible water will be collected. The minimum dimension for collection is 100' in length or width.

Level 40- Canals and Ditches. Canals and ditches will not be differentiated. Only canals and ditches with visible water will be collected. Canals and ditches will be single line up to 8' wide for 100 scale, or 30' wide for 200 and 400 scale. Where those dimensions are exceeded, two lines will be placed, one to represent each bank.

Level 45 - Swamps and Marshes. Swamps and marshes will not be differentiated. Only clearly identifiable swamps and marshes will be collected. The minimum dimension for collection is 1000' in length or width.

Level 41 - Shorelines. Shorelines for the Atlantic Ocean and Chesapeake Bay will be collected at the visible land/water interface the marshline will be on the landward side of the shoreline and the Shoreline will extend to the river bank. The dividing line between a river bank and shoreline will be decided by the compiler unless directed otherwise.

Level 6 - Bridges crossing a hydrographic feature will be collected as a single point in the center of the hydrographic feature. The elevation of the point will be at the estimated water surface.

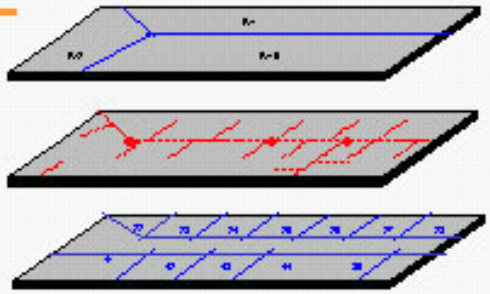
Level 4 – Dams and Spillways. Manmade dams and spillways will be collected to the extent they are visible and identifiable, and identified as a single point. The elevation of the point will be at the estimated water surface on the high water side of the feature.

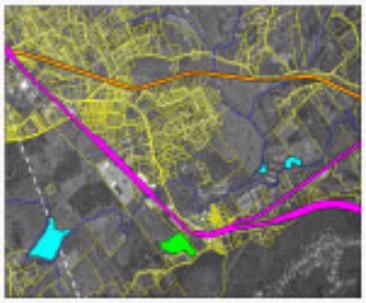
Level 21 – Headwall/Culvert. Headwalls and culverts will be collected to the extent they are visible and identifiable, and identified as a single point The elevation of the point will be at the estimated water surface.

The Virginia Base Mapping Program (VBMP)

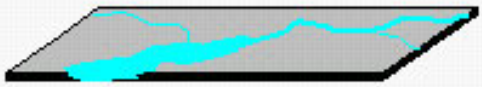
Planimetrics & Cadastre

Stakeholder Driven Guidelines, Standards, and Leadership guide ongoing data development

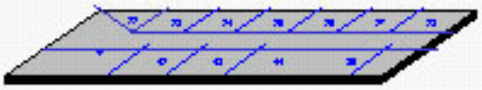




Hydrography



Addresses – E 911



Street Centerline

Digital Orthophotography Base Imagery

VGIN

Virginia Base Mapping Program (VBMP)
Local Government Product Deliverables

VBMP Overview

In 1997 the Virginia General Assembly established the Virginia Geographic Information Network (VGIN) a division within the Department of Technology Planning, under the direction of the Virginia Secretary of Technology. VGIN is mandated to coordinate, facilitate and promote the wise and effective development and use of spatial data, GIS, and related technologies across the Commonwealth.

The Base Mapping Issue

Virginia has a diverse community of agencies and organizations developing and using spatial data, GIS, and related technologies. A statewide evaluation by VGIN in 2000 revealed that at least 20 state agencies, more than a dozen utilities, a number of federal agencies, all 21 regional planning commissions, 10 colleges and universities, and at least 80% (108 of 134) of Virginia's independent cities and counties were developing and/or using spatial data and GIS. It has also been estimated that upwards of $200 million will be spent every few years developing, using, and maintaining GIS technology and spatial data across Virginia.

Comparison of Virginia local government's development and use of GIS in 2000 with the FGDC "framework" survey from 1999 indicates that spatial data and GIS technology are being adopted by local governments in Virginia at a very rapid rate (a growth of 33% between 1999-2000). VGIN's study identified the base map resource type, scale, and date that each active county and city was using to develop their spatial data and GIS. This information revealed that Virginia's local governments are creating a "patchwork quilt" of geographic information systems built upon diverse map bases, with varying accuracy, scales, orientation and dates. As a result, while each system might provide very adequate functionality within the jurisdiction, Virginia communities were ultimately (see: http://www.vgin.state.va.us/documents/Documents_Quilt_Map_Links.html.) building an inefficient spatial information infrastructure across the Commonwealth, which might severely reduce the efficiency and effectiveness of many local, regional, and state business applications that require multi-jurisdictional or regional data.

Many communities are justifiably focused on parochial needs including tax assessment and facilities maintenance. However, a significant portion of local government responsibilities (economic development, emergency preparedness and response, transportation planning and resource protection) require communities to access and work with data from outside their individual jurisdictions to be effective. Therefore, in order to promote the effective and economically efficient development and sharing of spatial resources across the Commonwealth, and to realize the highest and best use relative to cost, the Commonwealth of Virginia sought to establish a consistent foundation or base map resource upon which local government spatial data, applications, and GIS could be consistently developed and maintained.

Initiative History/Status (2000):

Governor Gilmore proposed in his 2000-2002 biennial budget approximately $3 Million to initiate the Virginia High Resolution Base Map Initiative. The funding (for FY 2002) covered the first year costs of a four-year development plan.

The General Assembly did not endorse the Governor's proposed funding mechanism.

Initiative History/Status (2001):

In the 2001 General Assembly Senator John Watkins offered the Virginia Base Mapping Initiative as a budget amendment for FY 2002. The amendment's $5 Million funding was considered budget neutral and would provide funding for the first year (FY 2002) of a two year plan to develop a base map for the entire land base of Virginia.

A final amended Virginia Budget for FY 2002 was never resolved.

Initiative History/Status (2002):

The Public Safety Communications Division was created in July of 2001 as part of the Department of Technology Planning, under the direction of the Virginia Secretary of Technology. The Division manages the administration of the Wireless E-911 Services Fund, under the direction of the Wireless E-911 Services Board and the Secretary of Technology. The Board and Division are responsible for ensuring that communities across the Commonwealth meet federally mandated deadlines for Wireless E-911 implementation and service.

Wireless E-911 systems use a latitude/longitude to identify the location of the caller. A consistent, statewide, high quality, high-resolution map base is required to accurately locate cellular callers. The Virginia Wireless Services Communications Board agreed to fund high resolution mapping systems when requested by communities implementing Wireless E-911. VGIN then asked the Board to consider the savings and efficiencies that could be realized by funding a consistent statewide base map. On October 10, 2001, the Public Safety Communications Board voted to fund the Virginia Base Mapping Program.

The Virginia High Resolution Base Mapping Program (VBMP)

Goal:

To establish one consistent, accurate, foundational base map to efficiently support statewide implementation of Phase II wireless E911 (E911 for Cell Phones). The Public Safety Services Board also recognized the opportunity and sought to establish a foundation upon which all local government and many regional, state, and federal spatial data applications could be built in order to establish and maintain an efficient statewide spatial information infrastructure.

Process:

On January 29, 2002, the Commonwealth contracted with VARGIS LLC. of Herndon, Virginia to produce full color, leaf-off, digital orthophotography for the entire land base of Virginia. The imagery is being developed at one of 3 scales:

- 1:4,800 scale (2' resolution) in rural areas
- 1:2,400 scale (1' resolution) in urban and suburban areas and
- 1:1,200 scale ($^1/_2$' resolution) in areas where localities choose the option to purchase higher accuracy product.

The extent of each scale was initially determined by evaluating population and housing densities to determine those areas that would be flown for 1:4,800 and 1:2,400 scale imagery. Each locality was then offered the opportunity to upgrade the scale of imagery in their locality by providing the cost difference between what the program would have paid and the cost of their optional upgrade.

By March 31, 2003, VGIN will deliver to each city and county in the Commonwealth a DVD set of Digital Orthophotography and Digital Terrain Model (DTM) covering the county and a minimum of 1000 feet surrounding the county/city. Each county/city will also receive DVD tapes with all the ancillary technical data acquired as part of the digital ortho production process. This data can be used to facilitate the efficient development of additional data (structures, topographic contours, etc.).

Licensing:

The VBMP's high-resolution digital orthophotography product will be licensed to all governments and public sector organizations in Virginia **at no cost**. The license will allow each government or organization free use of the data, and will only restrict the government, agency, or organization from redistributing the digital product to the private sector or distributors.

Ongoing Development and Use:

The VGIN Board and staff are working with both private and public sector partners to establish programs and partnerships, which will support the ongoing maintenance and update of the VBMP digital orthophotography products in the future. The data must remain current to remain valuable.

With support from the Wireless E-911 Services Board, the Secretary of Technology, the Department of Transportation, and local governments across Virginia, the VBMP program will build a statewide road centerline file and statewide addressing database. The VBMP Centerline Program is projected to produce a statewide road centerline file, fully integrated with the VBMP digital orthos by December 2003 and a cooperative and sustainable state and local address file by June of 2004.

VGIN, working with local government GIS users and managers groups from across the Commonwealth, will review, evaluate, and establish standards and guidelines for additional layers of geospatial data to ensure that ongoing data development will contribute to a consistent, efficient, and effective statewide geospatial information infrastructure.

Over the next several months VGIN will sponsor local government stakeholder work groups to review existing federal (FGDC) standards for cadastral and planimetric data and establish Virginia standards where necessary to ensure the data that is derived from the high-resolution digital orthophotography product is, to the degree possible, consistent across the Commonwealth and with the goals and requirements of the National Spatial Data Infrastructure (NSDI).

Please direct your questions or comments to: VBMP@vgin.state.va.us